



**Changkat Changi Secondary School**

# **UNIT 10.1 & 10.2**

## **Light--Reflection**

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

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### Lesson Summary & My Reflections

## NOTES 10.1

### LESSON OBJECTIVES

At the end of the lesson, you will be able to :

- Understand how light travels and how we are able to see.
- Understand the terms used for reflection: Normal, Angle of incidence & Angle of reflection
- State that, for reflection, the angle of incidence is equal to the angle of reflection

**Can you recall some properties of light you have learnt previously in lower secondary science?**

*Light is a form of energy.*

*Light travels in straight lines.*

*Straight lines used to trace light are known as light rays.*

*Light travel at a speed of  $3 \times 10^8$  m/s in vacuum.*

### How do we see things?

We all require light to see objects. In fact, our eyes detect light in a range of colours, namely, Red, Orange, Yellow, Green, Blue, Indigo, Violet (ROYGBIV)



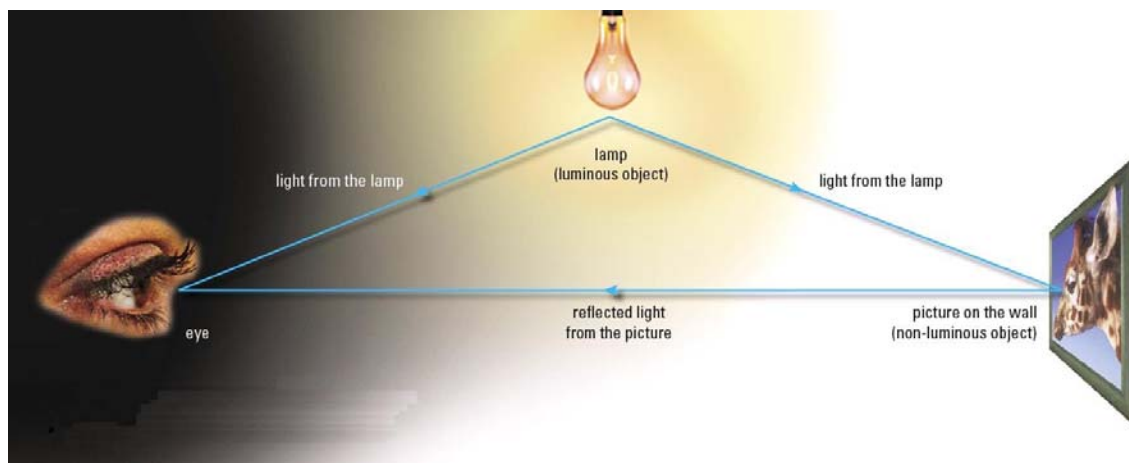
### Luminous versus non-luminous objects

Objects that give off light are known as luminous objects.

Can you name examples of such objects? Sun, table lamp etc

Those that do not give off light are known as non-luminous objects, for example Book, paper, apple etc..

For the case of a non-luminous object, we are able to see it because light from nearly luminous object( such as lamp) is reflected off the non- luminous object.



## What is Reflection ?

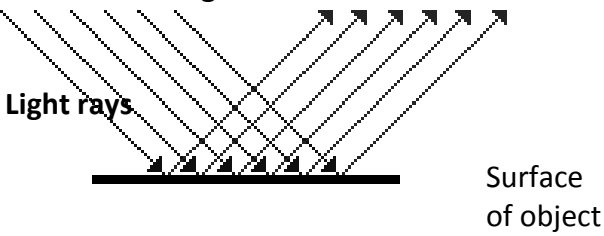
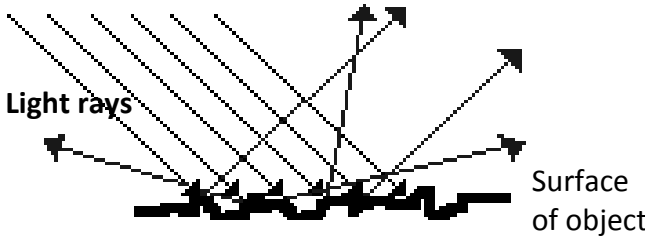
Reflection of light is the bouncing of light from a surface.

A smooth surface which reflects all the light falling on it is called a mirror and a straight / plane surface of this type is a plane mirror.

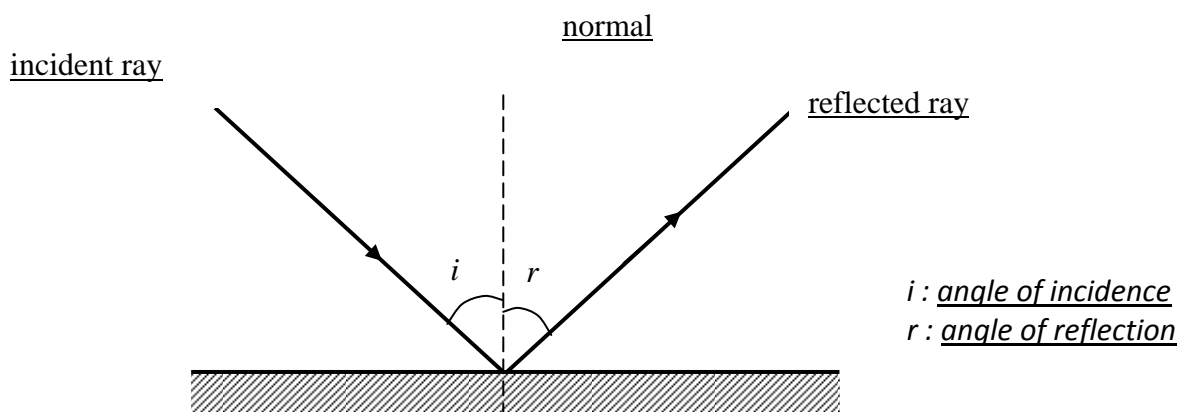


## Types of reflection

What are some differences in the two types of reflection shown below?

<p><b>Regular Reflection</b></p>  <p>Light rays</p> <p>Surface of object</p>	<p><b>Diffused Reflection</b></p>  <p>Light rays</p> <p>Surface of object</p>
<ul style="list-style-type: none"><li>• flat and smooth surfaces</li><li>• Light reflected as parallel beam of light</li><li>• Clear image seen</li></ul>	<ul style="list-style-type: none"><li>• irregular surface</li><li>• Light reflected is scattered</li><li>• Unclear / No image seen</li></ul>

## Terms used in a ray diagram for reflection e.g. single ray



## Laws of reflection

1. The incident ray, the reflected ray and the normal to the reflecting surface all lie in the same plane.
2. The angle of incidence is equal to the angle of reflection

$$\angle i = \angle r$$

## NOTES 10.2

### LESSON OBJECTIVES

At the end of the lesson, you will be able to :

- State properties of image in a plane mirror
- Apply the principle of reflection and properties of image to construct ray diagrams

### Properties of an image in a plane mirror

- Virtual (image cannot be captured on screen)
- Upright
- Laterally inverted
- Distance of the image from the mirror is the same compared to the distance of the object from the mirror.
- Same size



### Examples

The following illustrates how images of words are seen in a plane mirror reflection.

a)      **E**      

b)      **P**      

c)      **E X A M P L E**  


**Steps in constructing rays to show how light ray from object is reflected to the eye.**

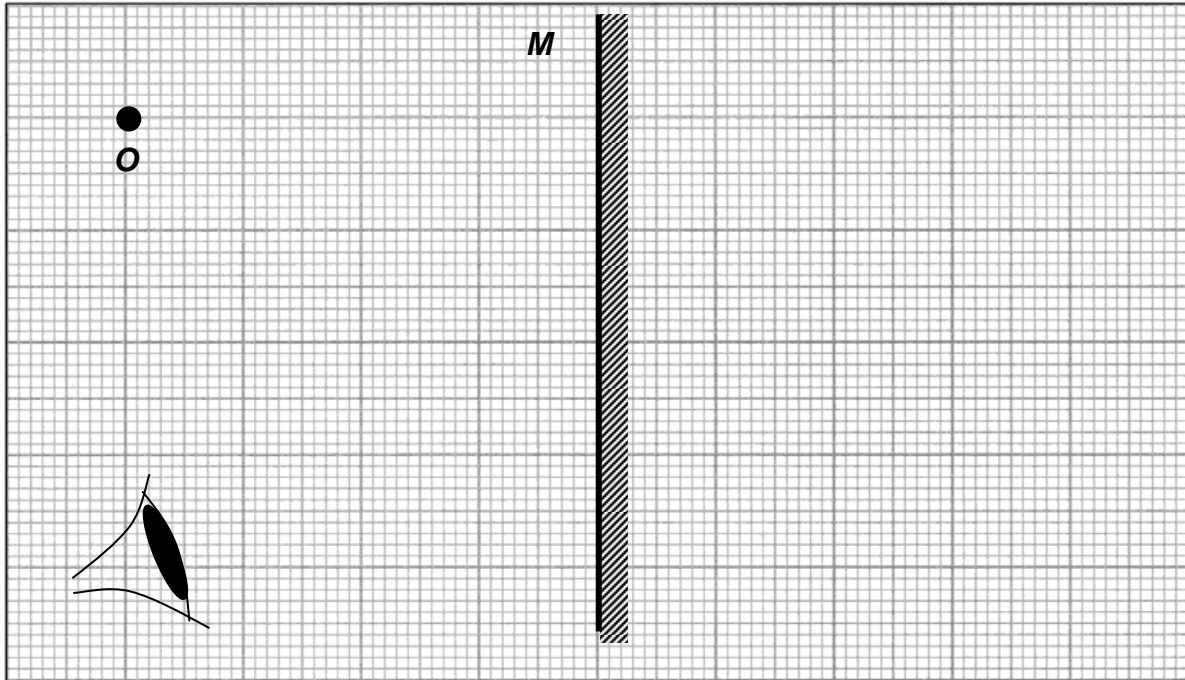
Step 1 : Find location of image in behind mirror. Mark as I.

Step 2 : Draw light ray/light rays from image to eye. Dotted lines for lines and image behind mirror.

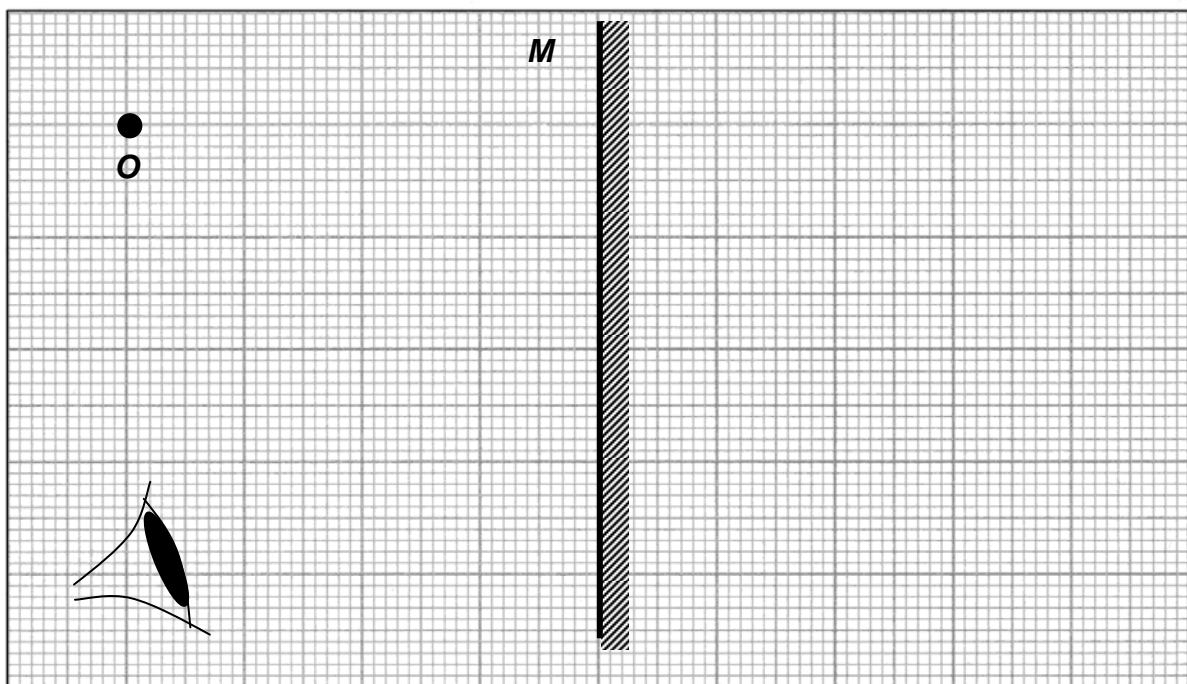
Step 3 : Draw rays from object to point of incidence at mirror surface.

Step 4 : Draw in arrows on rays from object to eye to show direction of light.

**Example 1 – Single ray diagram**



**Example 2 – Double ray diagram**



*Self-Practice*

The figure shows an object  $O$  and the eye in front of a plane mirror.

- (a) Mark the position of the image of the object in the mirror. Label the image as  $I$ .
- (b) Draw the paths of two light rays from the object, which are reflected by the mirror to the eye.

